Cameron Brain Tumor/ Brain Cancer Inquiry October 9, 2008

Missouri Department of Health and Senior Services

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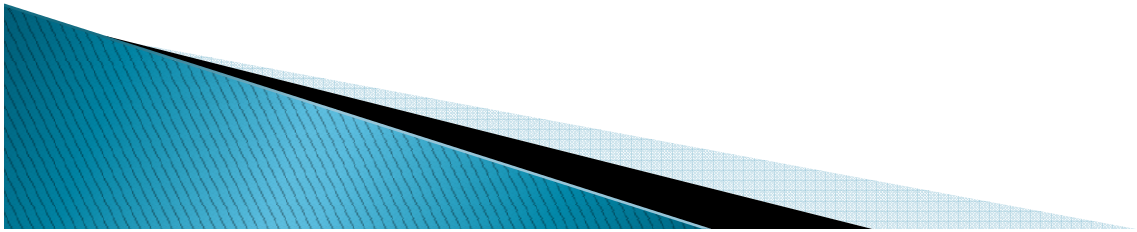
Steps of Cancer Inquiry Data Review

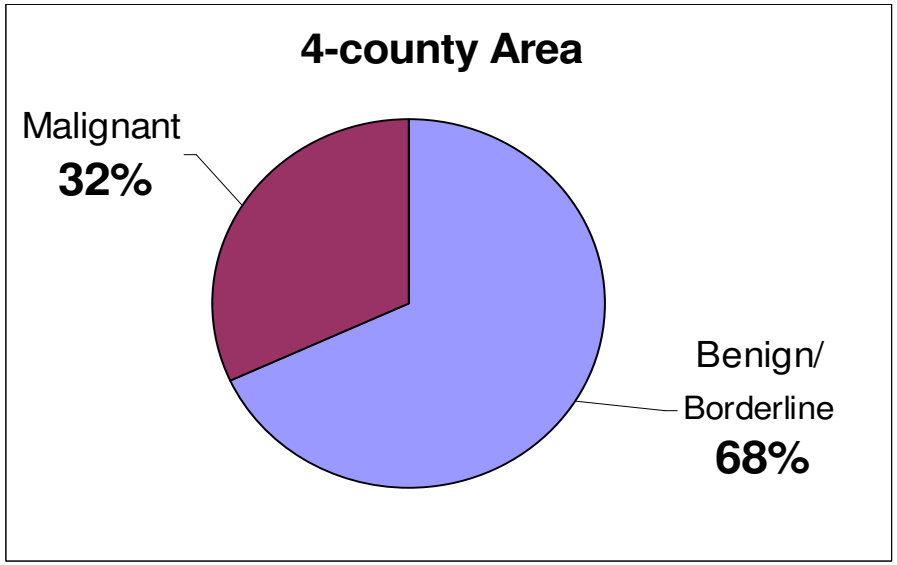
- Establish a case definition
  - Resident in Caldwell, Clinton, Daviess or DeKalb County
    - Cameron zip code (64429) crosses into all four
  - Diagnosed with malignant brain or central nervous system (CNS) tumor between January 1, 1996 – June 30, 2008, *OR*
  - Diagnosed with a benign brain or CNS tumor between January 1, 2004 – June 30, 2008

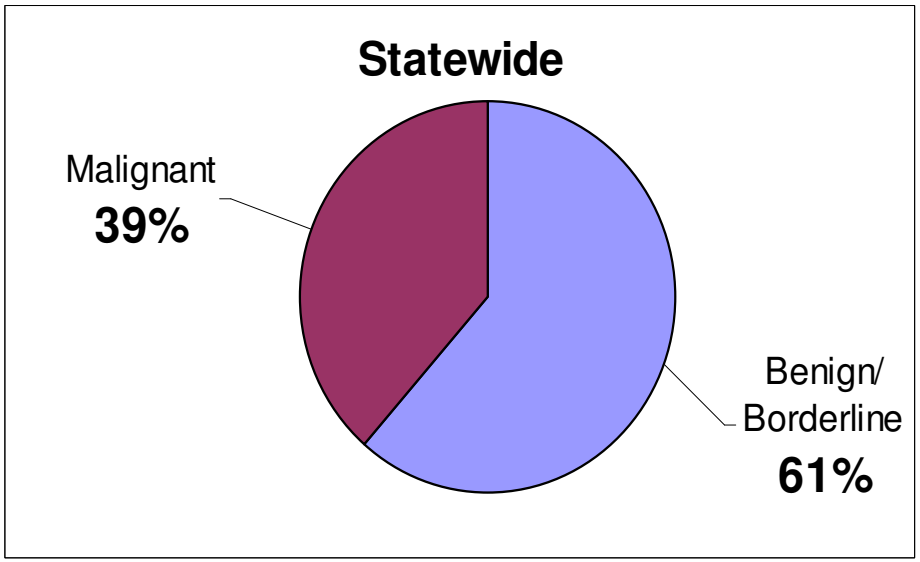
Steps of Cancer Inquiry Data Review

- Find All Cases That Meet the Case Definition
  - Missouri Cancer Registry (MCR) data
    - Malignant brain and CNS tumors, (O3 700-729, O3 malig)
    - Benign brain and CNS tumors, (O3 700-729,751-753, 03 BB)
    - Deaths coded to brain and CNS tumors, ICD-10 codes, 1999 - 2007
  - Rapid Case Ascertainment (RCA) data (through October 3, 2008)
  - Patient Information Forms
    - Received through September 22, 2008
    - Follow-up as warranted to confirm information
- Number of persons meeting the case definition: 70
  - 24 people with benign tumors
  - 46 people with malignant tumors



Percent of Primary Brain and CNS Tumors by Behavior (malignant or benign), 2004-2006, Four-county area (Caldwell, Clinton, Daviess, DeKalb) Compared with Missouri

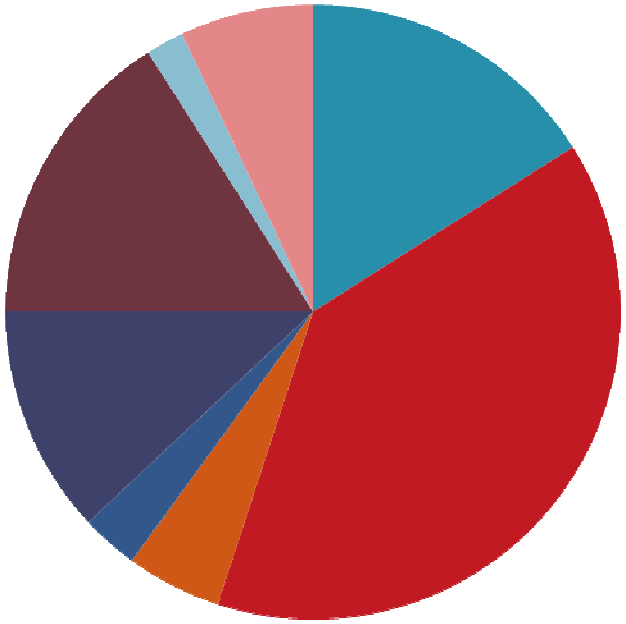




Patient Information Forms

- Each form reviewed to see if it meets the case definition
- Received on patients living in multiple states and throughout Missouri
- Reports covered a 40 year time frame, many different disease sites/types
- Inmates in Cameron correctional facility included
- Information on 98 people received; multiple follow-up calls made to confirm/clarify information, when needed.

When Patient Information Forms Did Not Meet the Case Definition



- Not in 4 county area (16%)
- Different type of cancer (39%)
- Not a reportable condition (5%)
- Not in timeframe (3%)
- Insufficient information (12%)
- More than one reason (16%)
- Spread from another site (2%)
- Not reportable at diagnosis (7%)

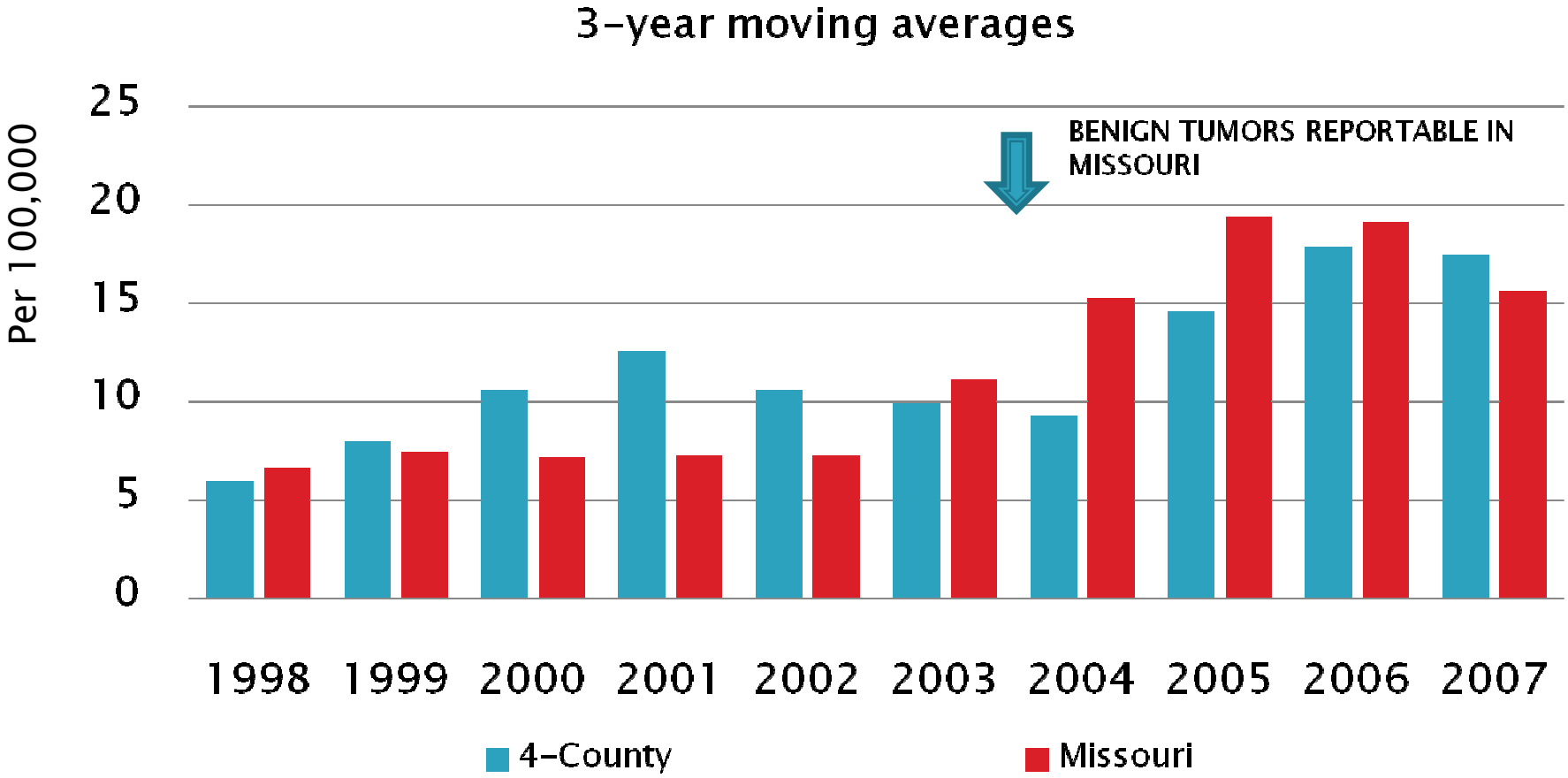
Steps of Cancer Inquiry Data Review

- Orient the Data in Time, Person and Place

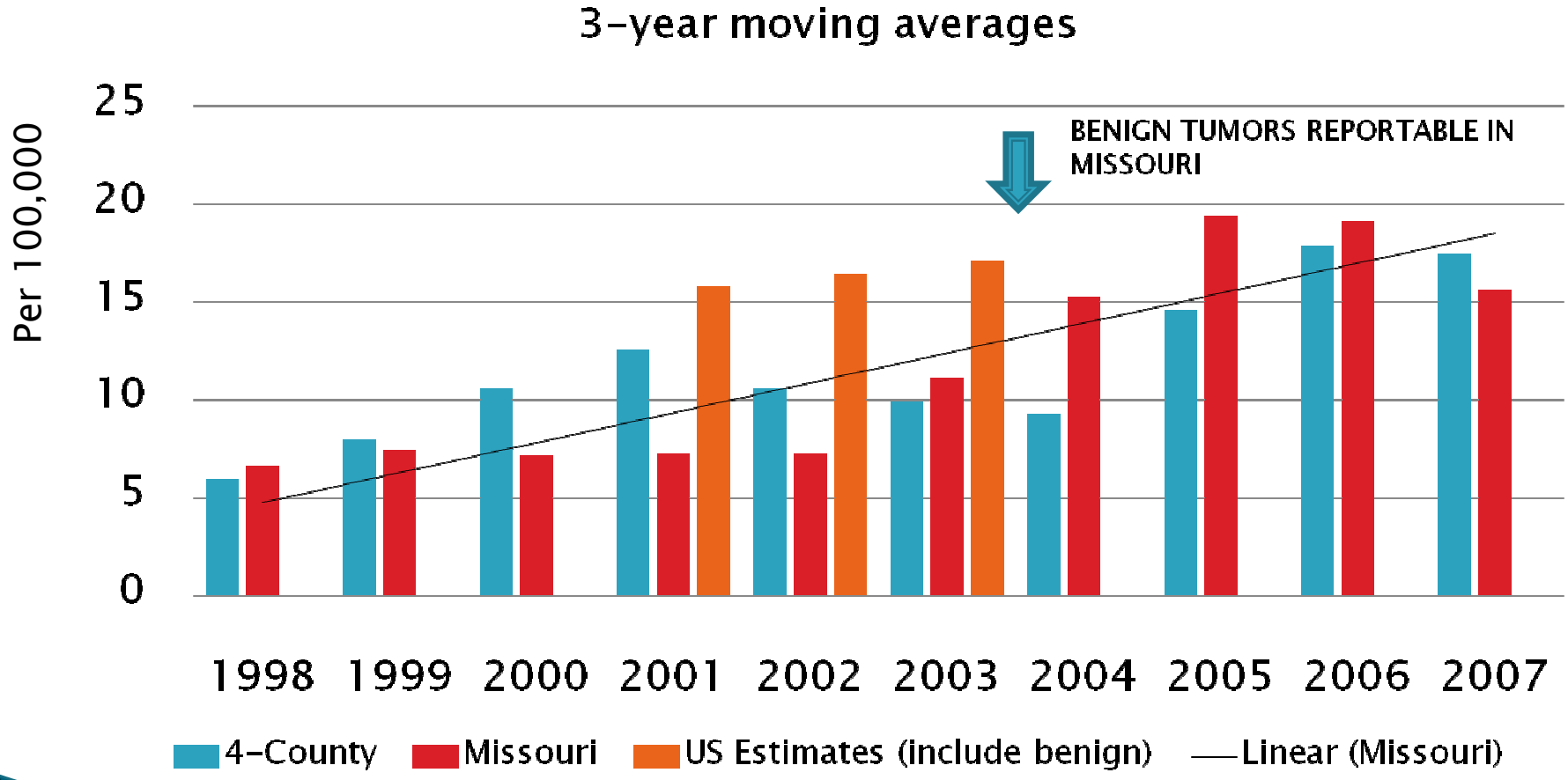
  Useful terms:

  - An incidence rate is a measure of risk and based on new cases of disease in a defined population for a specific time period. It is often shown as 'per 100,000 people' for rare diagnoses such as brain tumors.
  - When you compare the incidence rate locally to an 'expected' rate (based on state data) you get a Standardized Incidence Ratio (SIR).
  - A 3-year moving average is a smoothing technique used when smaller populations are being reviewed.

Incidence Rates of Brain and CNS Tumors in 4-Counties (Caldwell, Clinton, Daviess and DeKalb) and Missouri



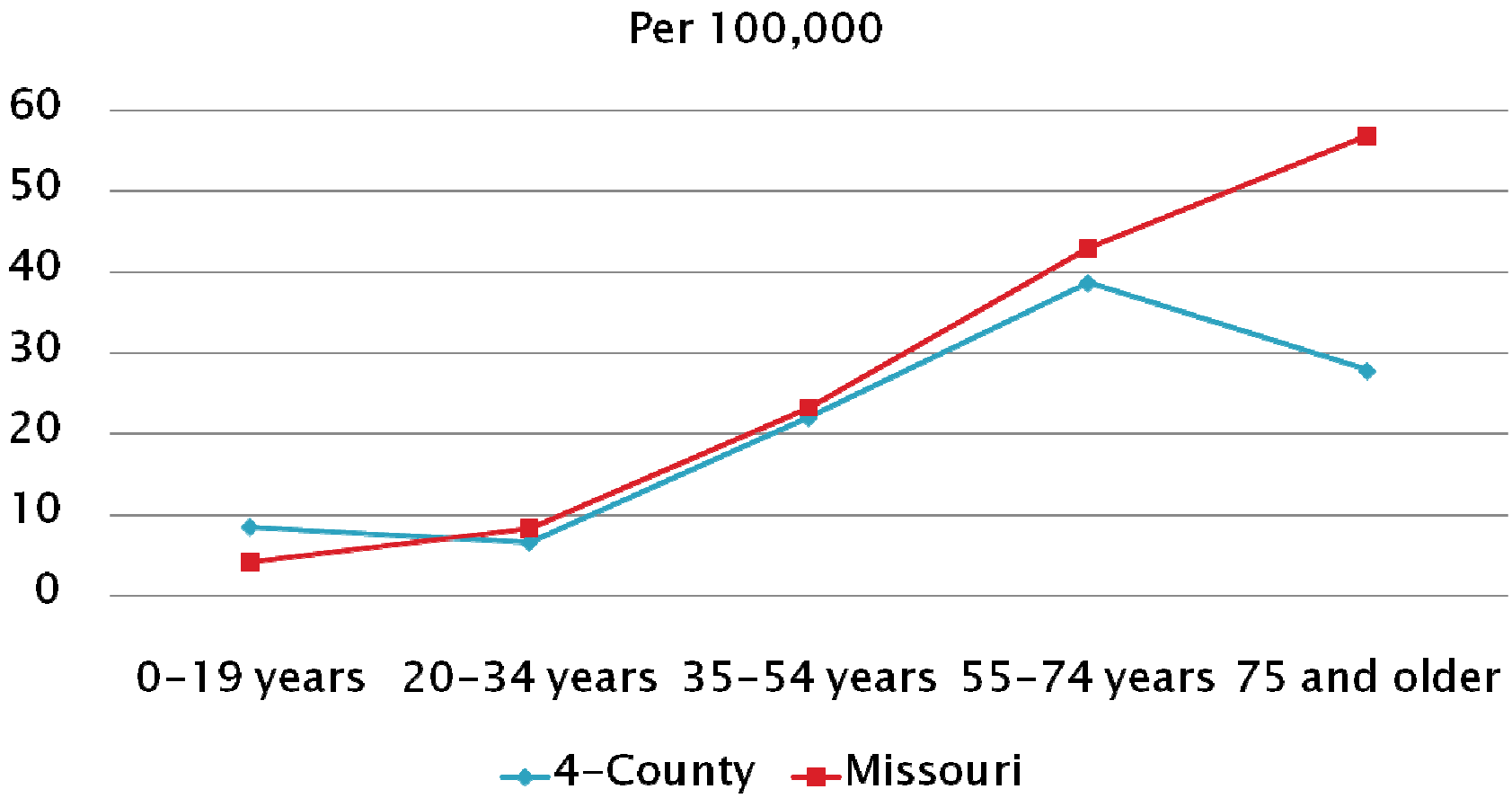
Incidence Rates of Brain and CNS Tumors in 4-Counties, Missouri, and National Estimates



Interpretation of Time Trends

- The incidence of malignant and benign brain tumors has increased over time in the Cameron area and in Missouri.
  - Same trend as national
- No difference is detected by specific county of residence so all 4 counties are combined to increase likelihood of detecting differences.
- Reporting for 2006-2008 is not complete yet so rates are likely to increase.

Age-Specific Incidence of Primary Brain and CNS Tumors



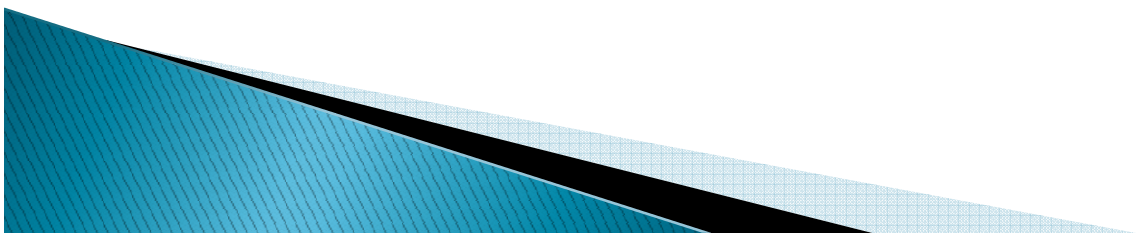
Interpretation of Age-Specific Rates

- The incidence of malignant and benign brain tumors varies by age group, but generally increases with age.
- The 4-county area age-specific rates are similar to Missouri rates, except there is a slight increase in the 0-19 year old age group
  - This increase is in benign brain tumors and based on a very small number of tumors (which may produce an unstable rate).
- Residents in the area 75 years of age and older had a statistically significant lower brain tumor rate when compared to Missouri.

Age-Specific Rates Death Rates Due to Malignant or Benign Brain Tumors

- No significant differences were found when both types were combined or for benign brain tumors by age.

- The mortality rate for malignant brain tumors was significantly higher for the 0-19 year old age group in the Cameron zip code when compared to the State rate. This was based on a very small number of cases.



Cancer from All Causes

- No increases were found in the incidence or mortality rates of 'all cancers' in the Cameron zip code, each county, or the 4-county area compared to the State.

- Lower than expected rates of 'all cancers' were found:
  - Daviess County: among 35-74 year olds
  - DeKalb County: among adults $\geq$ 35 years of age
  - 4-Counties: among 55-74 year olds and all ages combined

Burden of Cancer and Benign Brain & CNS Tumors, Four-county area Compared with Missouri, 2004-2006

4-County Area

1. Lung & Bronchus (17.1%)
2. Prostate (12.7%)
3. Colon & Rectum (11.9%)
4. Female Breast (11.0%)
5. Urinary Bladder (4.9%)
6. Kidney& Renal Pelvis (4.4%)
7. Leukemia (3.8%
8. Corpus & Uterus (3.4%)
9. Non-Hodgkin Lymphoma (3.4%)
10. **Benign and malignant brain (3.1%)**

Missouri

1. Lung & Bronchus (16.8%)
2. Female Breast (13.5%)
3. Prostate (11.8%)
4. Colon & Rectum (10.8%)
5. Urinary Bladder (4.2%)
6. **Benign and malignant brain (3.9%)**
7. Non-Hodgkin Lymphoma (3.8%)
8. Melanoma of the Skin (3.5%)
9. Kidney& Renal Pelvis (3.4%)
10. Corpus & Uterus (2.8%)

Lung Cancer

- Because environmental radon was an expressed concern by some community members, we analyzed lung cancer incidence and mortality comparisons.

- Findings:
  - Clinton county: higher lung cancer incidence rate than expected for people 20-54 years of age;
  - Daviess county: higher lung cancer incidence rate than expected for people 20-34 years of age.

For Your Information

- The DHSS Missouri County Level Study was just released and provides information for each county on adults:
  - Preventive health behaviors,
  - Current tobacco use,
  - Tobacco cessation, and
  - Secondhand smoke exposure

- Some print outs available on back table
- Searchable database with mapping capability: http://www.dhss.mo.gov/CommunityDataProfiles/

Click on '2007 County Level Study'

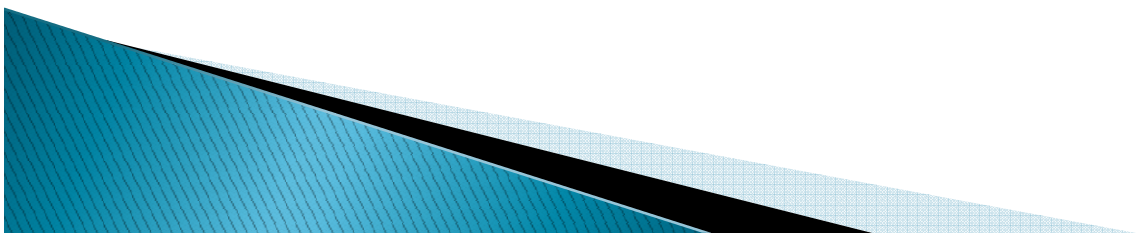
So, Where Do We Go From Here?

- Known risk factors for brain tumors include:
  - Ionizing radiation
  - HIV infection
  - Genetics
  - Some chemical exposures (vinyl chloride, acrylonitrile) when measured among workers

  - But most people with brain tumors do not have these risk factors.

The ‘good and bad’ of having too few cases

- No one wants to have a tumor, so low numbers in a community are GOOD,
- Epidemiologically, when we study what causes a disease we most often have to study A LOT of cases in order to find what is causing the disease.
- Cancer registries often work together through the Central Brain Tumor Registry of the United States (CBTRUS) so they will have sufficient sample sizes to look for cancer causes.



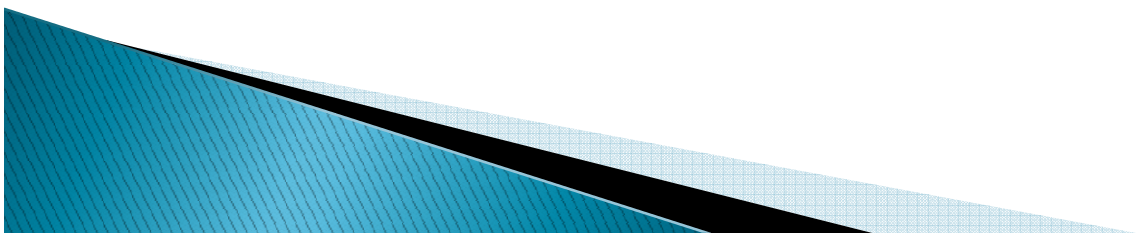
Observations and Recommendations

- Environmental testing has already taken place in areas of concern in the community.
  - No exposures known to cause brain tumors have been found.
- Because some people are still undergoing diagnostic work-up for potential new tumors, the Missouri Cancer Registry should do a live database search again in 12 months to determine if clustering becomes apparent with additional cases.

Thank you!

- This presentation is dedicated to all the community members who have been affected by cancer and non-malignant brain tumors. We appreciate your desire for healthy lives as individuals, family members, and neighbors within a broader community and your willingness to share your stories and information so our work on the 'data' side is as accurate as possible.

--Your data team



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A special thanks to tumor registrars across the state and partners from other states!

Thank

You